



United States  
Department of  
Agriculture  
Forest Service

## FOREST INSECT AND DISEASE MANAGEMENT

### Technology Update

Southeastern Area, State and Private Forestry, 1720 Peachtree Road, N.W., Atlanta, Ga. 30367

#### Southern Pine Beetle Fact Sheet Number 7

#### PTAEDA: A LOBLOLLY PINE GROWTH MODEL

##### DESCRIPTION

This fact sheet describes a computer model whose acronym, PTAEDA, is derived from the scientific name for loblolly pine, *Pinus Taeda* L. PTAEDA simulates growth and volume yield in managed loblolly pine plantations. Existing stands, or stands that will be planted, can be simulated. PTAEDA can be used to estimate the impact of silvicultural treatments, including thinning, fertilizer application, and site preparation.

PTAEDA presently applies only to plantations. A companion model is being developed for seeded stands.

##### METHODOLOGY

PTAEDA is an individual-tree, simulation model as distinguished from stand regression models.

Yield predictions are based on stand characteristics. A stochastic element is included in the model to incorporate probability into the prediction function. Randomly chosen probability factors are used to generate mortality and to represent microsite and/or genetic variability when projecting growth. Thus, volume yield is estimated as a function of tree size, site conditions, competition, and random probability factors.

##### OBJECTIVES

The influence of three silvicultural practices on tree growth and volume yield can be assessed:

**Site preparation.**--The effect is based on two parameters: (1) original proportion of competing stems, and (2) the age at which the stand will be released to old-field conditions.

**Fertilization.**--The effect is based on three parameters: (1) the maximum response in site quality, (2) the length of time to obtain the maximum response, and (3) the length of time of the response.

**Thinning.**--The effect is based on three parameters: (1) the type of thinning undertaken, such as a row, from below, or combination, (2) the thinning diameter or basal area limits, and (3) the row to be thinned.

##### Other Inputs

1. Site index.
2. Trees per acre at planting or the distance between trees and the distance between rows.
3. For existing stands, trees surviving per acre and present age.

##### Outputs

1. Basal area per acre.
2. Number of trees per acre by diameter class.
3. Total stem cubic foot volume.
4. Total above-ground biomass.
5. Frequency of tree mortality by diameter class (number of live, dead, and thinned trees).

##### FURTHER INFORMATION

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#### REFERENCES

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